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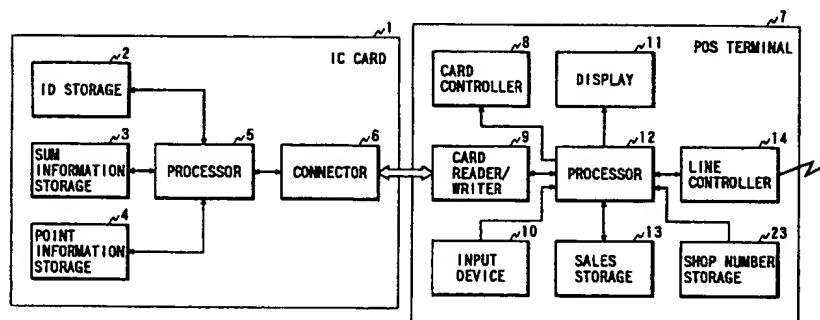
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(54) IC card automated transaction terminal and IC card used therein

(57) An IC card automated transaction terminal is provided to operate in conjunction with an IC card capable of storing a plurality of different balances relating to commercial transactions. For example, the IC card can provide separate storage for electronic money information and bonus point information. IC card reading/writing means are provided in the terminal for reading and writing such information stored in said IC card along with

input means for inputting transacted sum information and information storage means for storing electronic money information equivalent to transacted sum information. In another embodiment, small sum and large sum balances can be separately stored on the IC card, with only the large sum balance being locked and requiring a security code to carry out a transaction.

FIG. 1



present invention;

Fig. 3 is a flowchart showing processing by the electronic wallet applied system according to the present invention;

Fig. 4 is a block diagram showing an electronic wallet applied system equivalent to a second embodiment according to the present invention;

Fig. 5 is a flowchart showing processing by the electronic wallet applied system equivalent to the second embodiment according to the present invention;

Fig. 6 is a flowchart showing processing by another example of the electronic wallet applied system equivalent to the second embodiment according to the present invention;

Fig. 7 is a flowchart showing processing for paying electronic money with an IC card by the electronic wallet applied system according to the present invention;

Fig. 8 is a block diagram showing an electronic wallet applied system equivalent to a third embodiment according to the present invention;

Fig. 9 is a flowchart showing processing by the electronic wallet applied system equivalent to the third embodiment according to the present invention;

Fig. 10 is a block diagram showing an electronic wallet applied system equivalent to a fourth embodiment according to the present invention;

Fig. 11 is a flowchart showing processing by the electronic wallet applied system equivalent to the fourth embodiment according to the present invention;

Fig. 12 is a block diagram showing an electronic wallet applied system equivalent to a fifth embodiment according to the present invention; and

Fig. 13 shows point information storage in the electronic wallet applied system equivalent to the fifth embodiment according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments according to the present invention will be described below referring to Figs. 1 to 13.

Fig. 1 is a block diagram showing an electronic wallet system equivalent to a first embodiment according to the present invention. This is a system in which point information, issued by a shop based upon the sum of shopping is stored in an IC card together with sum information of the balance of electronic money so that premium service equivalent to the point information can be provided to its specific customer. In this embodiment, a system in which a customer can do his/her shopping of the sum equivalent to point information will be described as an example.

A reference number 1 denotes an IC card, 2 denotes an ID number storage for storing a personal

password and other ID information, 3 denotes a sum information storage for storing the balance of electronic money, 4 denotes a point information storage for storing point information issued by a shop, 5 denotes a processor, 6 denotes a connector, 7 denotes a POS terminal, 8 denotes a card controller, 9 denotes a card reader/writer, 10 denotes an input device, 11 denotes a display, 12 denotes a processor, 13 denotes a sales storage, 14 denotes a line controller and 23 denotes a shop number storage.

Fig. 2 shows an example of the point information storage 4. In this case, a shop number is allocated to each shop beforehand so that a plurality of shops can simultaneously provide premium service based upon point information by one IC card and every shop number, the date of shopping, point information based upon the sum of shopping and the total points are stored. If a customer pays the price of shopping by his/her points, the number of used points is subtracted from the number of points stored in the point information storage 4.

To store his/her point information, a customer is required to contract with a shop beforehand and, at that time, a shop number is registered in the IC card. In the case of a chain store such as a convenience store, points are added to the same shop number by using the same shop number in each store and premium service can be provided from the entire group of chain stores.

Each portion of information stored in the above ID number storage 2, the above sum information storage 3 and the above point information storage 4 is processed by the processor 5. The IC card communicates this processed information with an external POS terminal and others via the connector 6.

The price of a commodity (i.e., an input sum) is input to the POS (point-of-sale) terminal via the input device 10 in the POS terminal 7 and the input sum and other information is displayed on the display 11. Electronic money information sent to the POS terminal 7 via the card reader/writer 9 is stored in the sales storage 13 and sales for a day can be sent to a bank via a telephone line by access to the bank via the line controller 14.

Next, processing for clearing of shopping and point information will be described referring to Fig. 3. When a customer inserts his/her IC card into a POS terminal in payment at a shop (step S102) and a salesclerk thereof totalizes the sum of shopping (step S103), the totalized sum is displayed on the display 11 in a step S104. Afterward, a shop number stored in the point information storage 4 in the IC card is read in a step S105 and the processor 5 determines in a step S106 whether a shop number stored in the shop number storage 23 in the POS terminal is registered in the IC card or not.

First, a case in which a shop number is registered will be described. In this case, since the customer is a registered customer of the specific shop, he/she can be provided premium service equivalent to point information in the IC card. When point information in the IC card

IC card. These sum information storage are classified into a large sum information storage and a small sum information storage. The large sum information storage is ordinarily locked by personal identification numbers, however, the small sum information storage is ordinarily not locked. Therefore, since personal identification numbers are required to be input in paying a large sum, but are not required to be input in paying a small sum such as the price of a tobacco and a telephone charge, both a convenient normal function and a function for providing security when an IC card is lost can be met by one IC card.

Referring to Fig. 4, a reference number 15 denotes an ID number storage A, 16 denotes a sum information storage A, 17 denotes an ID number storage B and 18 denotes a sum information storage B. Electronic money stored in the sum information storage A is used to pay small sums and electronic money stored in the sum information storage B is used to pay large sums. The sum information storage A is locked by personal identification numbers registered in the ID number storage A and the sum information storage B is locked by personal identification numbers registered in the ID number storage B.

While being locked by personal identification numbers, the input of personal identification numbers registered in an IC card is required in paying by electronic money and if the personal identification numbers are not input correctly, payment by electronic money in an IC card is disabled. Therefore, to prevent a lost IC card from being used unfairly, it is desirable that the sum information storage is ordinarily locked by personal identification numbers. However, in this case, inputting of personal identification numbers is required for every normal payment, no matter how small, and a problem occurs that the facility and convenience of an IC card is deteriorated.

As shown in Fig. 4, a "pocket A" for paying a small sum and a "pocket B" for paying a large sum are provided in one IC card, and the pockets A and B are switched based upon a paid sum. Referring to Fig. 5, concrete processing will be described below.

When a customer pays in a shop, he/she inserts his/her IC card into a POS terminal there (a step S202) and when a salesclerk there totalizes the sum of shopping (a step S203), the total amount is displayed on a display 11 in a step S204. Afterward, the balance A of electronic money stored in the sum information storage A in the pocket A is read by a card reader/writer 9 in a step S205 and a processor 12 in the POS terminal determines in a step S206 whether the sum of shopping can be paid or not.

In this case, as the balance A is for paying a small sum, the sum information storage A is updated in a step S207 if the sum of shopping can be paid, and a sales storage 13 in the POS terminal is updated in a step S218. On the other hand, in the case of paying a large sum, as the balance A is not enough to pay a large sum and a large sum cannot be paid by the balance A, pay-

ment using the pocket A is automatically switched to payment by the balance stored in the sum information storage B in the pocket B.

As the sum information storage B is ordinarily locked by personal identification numbers registered in the ID number storage B, words for prompting a customer to input his/her ID number are displayed on the display 11 in a step S208. When the customer inputs his/her personal identification numbers via an input device 10 (step S209), his/her personal identification numbers registered in the ID number storage B are read in a step S210 and a processor 5 determines in a step S211 whether the read personal identification numbers are equal to those input via the input device 10 or not. As the IC card may be used unfairly if personal identification numbers are not equal, the IC card is ejected in a step S219 and the transaction is stopped in a step S220. In the meantime, if personal identification numbers are equal, the balance B stored in the sum information storage B is read in a step S212 and the processor 5 determines in a step S213 whether the sum of shopping can be paid or not.

If payment by electronic money is enabled, the sum information storage B is unlocked in a step S214 and the sum of shopping is subtracted from electronic money in an IC card. After the balance B of the sum information storage B is updated in a step S215, the sum information storage B is automatically locked by the above personal identification numbers in a step S216. Further, after the sales storage 13 in the POS terminal is updated in a step S218, the IC card is ejected in a step S219 and the processing is finished in a step S220.

On the other hand, if payment is disabled, the IC card is ejected in a step S219 after it is displayed on the display 11 that the balance B is short in a step S217 and the transaction is stopped in a step S220.

In summary, a system in which a plurality of sum information storage are provided in one IC card has been described above. In this system, the plurality of sum information storage are classified into a large sum information storage and a small sum information storage and both of a normal convenient function and a function for providing security when an IC card is lost can be met by one IC card by ordinarily using the small sum information storage without locking it while the large sum information storage is ordinarily locked by personal identification numbers.

In the Fig. 5 process, a system is used in which, when a large sum is to be paid, the balance of the small sum information storage A is first determined to be short in step 206. In other words, the total amount of the small sum storage A provides the upper limit value to the receivable sum of electronic money which can be paid from the sum information storage A in an IC card. If payment by electronic money stored in the small sum information storage A is not possible because the requested amount is too large, automatically the system is switched for payment by electronic money stored in the

after the frequency of access is updated in a step S518 and the transaction is stopped in a step S520.

When the balance stored in the IC card is read, it is determined in a step S514 whether the sum of shopping can be paid by the balance stored in the IC card or not. If the sum of shopping can be paid, the balance stored in the IC card is updated in a step S515 and a sales storage in the POS terminal is updated in a step S517. After the frequency of access is updated, the IC card is ejected and the processing is finished. In the meantime, if the sum of shopping cannot be paid, the IC card is ejected after it is displayed that the balance is short in a step S516 and the processing is stopped.

As described above, only one sum information storage is provided in an IC card and the input of personal identification numbers may be also required depending upon a withdrawn sum. In this case, a limitation can be imposed on unfair use by requiring the input of personal identification numbers when the frequency of access to the IC card reaches a fixed frequency N.

In the above embodiments shown in Figs. 4 to 7, a plurality of sum information storage are classified into a large sum information storage and a small sum information storage, however, they may be also be classified for other purposes of payment. For example, in the case of an office worker, clearing money expended for a business trip can be simplified by classifying money used for his/her business and money used privately in one IC card and switching them depending upon a purpose in payment. For example, as shown in a flowchart in Fig. 11, public money used for the business of a company is stored in a pocket A, while money used privately is stored in a pocket B, and they can be readily switched by a user in paying electronic money.

For example, a sum information storage dedicated to payment to a specific railroad corporation can be also provided to a plurality of sum information storage. In this case, service can be also provided to a user by adding a fixed premium to the dedicated sum information storage.

Next, Fig. 10 is a block diagram showing an electronic wallet system equivalent to a fourth embodiment according to the present invention. This is a system in which sum information and personal information such as an address and a telephone number are stored in one IC card and in this embodiment, a case that an address is entered for door-to-door service will be described below.

Referring to Fig. 10, a reference number 19 denotes a personal information storage for storing a name, an address and a telephone number. A reference number 20 denotes a printer for printing the above personal information on an invoice for door-to-door service. A reference number 21 denotes a POS terminal in which a function for printing personal information is built.

If a customer requests door-to-door service to deliver a package, he/she passes his/her IC card to a clerk there and pays for the package by electronic

money stored in a sum information storage 3. His/her address and name can be automatically printed in the field of a client of the invoice by the printer 20 by reading personal information stored in the personal information storage 19. In this case, items in the field of a destination are handwritten, however, if the information of the destination is also stored in the personal information storage 3, required information can be automatically printed in the field of the destination.

According to the present invention, when a shop provides a variety of premium service in a commercial transaction by an electronic wallet system, the sum of shopping can be paid and point information can be managed in only one IC card by storing sum information and point information in the IC card.

In the above system, sum information and point information are separately stored in a plurality of areas in an IC card, however, sum information can be also separately stored in a plurality of areas. In this case, sum information stored in one area is used for payment of a small sum and sum information stored in the other area is used for payment of a large sum. Thus, both a normal convenient function and a function for providing security when an IC card is lost can be met by one IC card by ordinarily enabling payment in the area for payment of a small sum and ordinarily locking the area for payment of a large sum by personal identification numbers.

While the present invention has been described in detail and pictorially in the accompanying drawings it is not limited to such details since many changes and modifications recognizable to those of ordinary skill in the art may be made to the invention without departing from the spirit and the scope thereof.

Claims

1. An IC card automated transaction terminal for performing a commercial transaction by updating sum information stored in an IC card by the sum of a transaction, comprising:

input means for inputting an instruction in relation to a transaction;

IC card reading/writing means for reading and writing information from/to said IC card for storing a first balance and a second balance in said IC card; and

control means for reading one or both of said first balance and second balance from said IC card by controlling said IC card reading/writing means, subtracting the sum of a transaction input from said input means from one or both of said first balance and second balance specified by an instruction from said input means and updating said specified balance in said IC card.

2. An IC card automated transaction terminal according to Claim 1, wherein:

said first balance is the balance of a sum of electronic money; and

said second balance is the balance of points provided based on the number of transactions which the IC card has been used for.

14. An IC card according to Claim 12, wherein:

said second storage area stores plural balances of points from a plurality of participating shops.

15. An IC card according to Claim 14, wherein:

said second storage area stores a shop number to specify a shop in which said plural balances of points are effective corresponding to said plural balances of points.

16. An IC card according to Claim 12, wherein:

said first balance and said second balance are both balances of sums of electronic money.

17. An IC card according to claim 12, wherein:

said first and second storage area further store an upper limit value of an amount which can be subtracted from said first and second balances.

18. An IC card automated transaction terminal for performing a commercial transaction by updating sum information stored in an IC card by the sum of a transaction, comprising:

input means for inputting an instruction in relation to a transaction;

IC card reading/writing means for reading and writing information in said IC card for storing a first balance and a second balance; and

control means for updating a specified balance in said IC card by reading one or both of said first balance and said second balance from said IC card by controlling said IC card reading/writing means and subtracting the sum of a transaction input from said input means from one or both of said first balance and said second balance specified according to an instruction from said input means.

19. An IC card automated transaction terminal according to Claim 18, wherein:

said first balance is the balance of a sum of electronic money; and

said second balance is information showing the balance of points provided based on the number of transactions which the IC card has been used for and the level of service which the

IC card is entitled to receive.

20. An IC card automated transaction terminal according to Claim 19, wherein:

said control means updates said balance of points in said IC card by adding the value of a point equivalent to said sum of a transaction to said balance of points read from said IC card when said balance of a sum is updated.

21. An IC card automated transaction terminal according to Claim 19, wherein:

said control means changes the value of points equivalent to said sum of a transaction according to information showing said level of service.

22. An IC card automated transaction terminal according to Claim 19, further comprising:

shop number storage means,

wherein said control means reads a shop number stored corresponding to said balance of points in said IC card before said balance of points in said IC card is updated; and

wherein said control means updates said balance of points in said IC card only if said read shop number and its shop number stored in said shop number storage means are equal.

23. An IC card automated transaction terminal according to Claim 18, wherein:

said first balance is the balance of a sum of electronic money; and

said second balance is the balance of points provided based on the number of transactions the IC card has been used for.

24. An IC card automated transaction terminal according to Claim 23, wherein:

said control means updates said balance of points in said IC card by adding the value of a point equivalent to said sum of a transaction to said balance of points read from said IC card when said balance of a sum is updated.

25. An IC card automated transaction terminal according to Claim 23, further comprising:

shop number storage means for storing a shop number and storage means for storing customer information,

wherein said control means reads a shop number stored corresponding to said balance of

FIG. 1

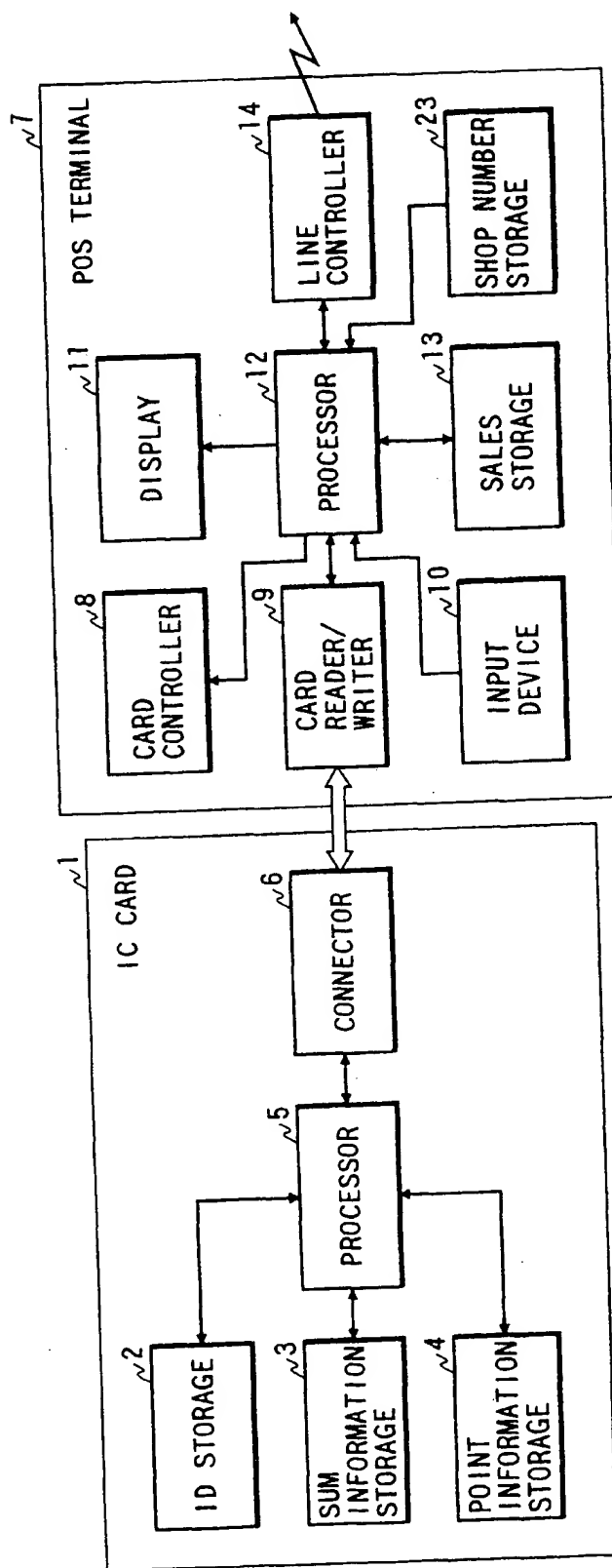


FIG. 3

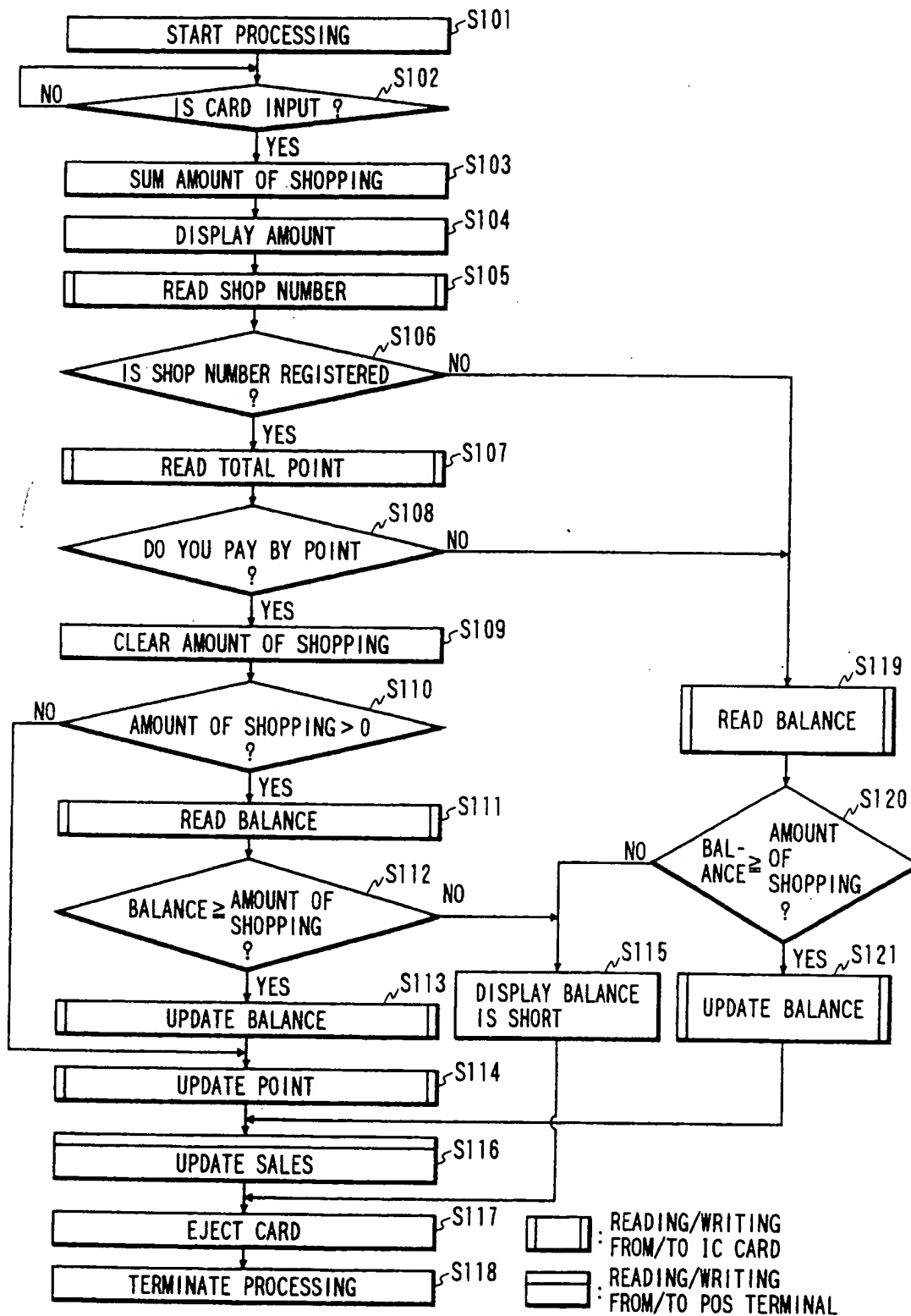


FIG. 5

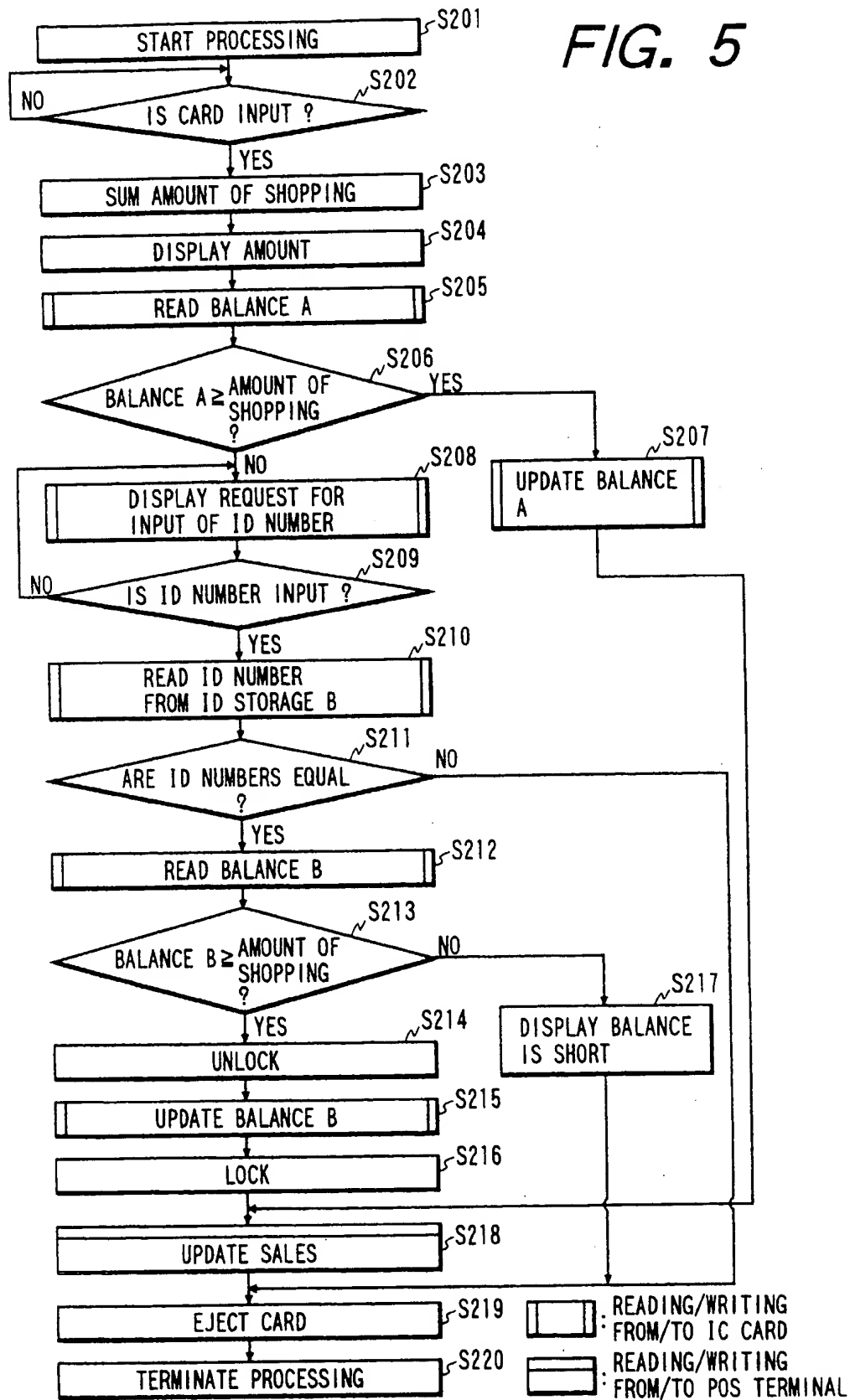


FIG. 7

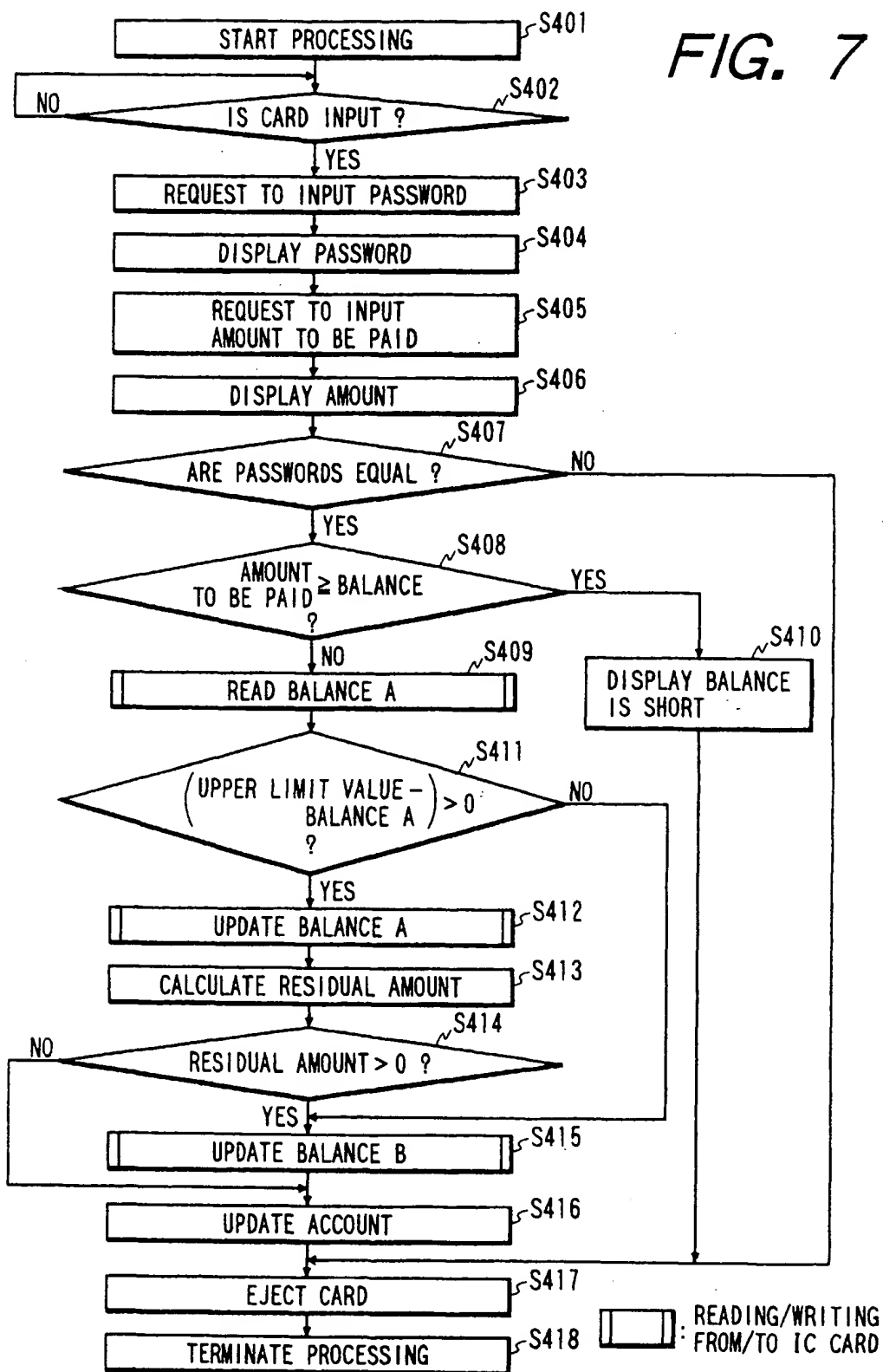


FIG. 9

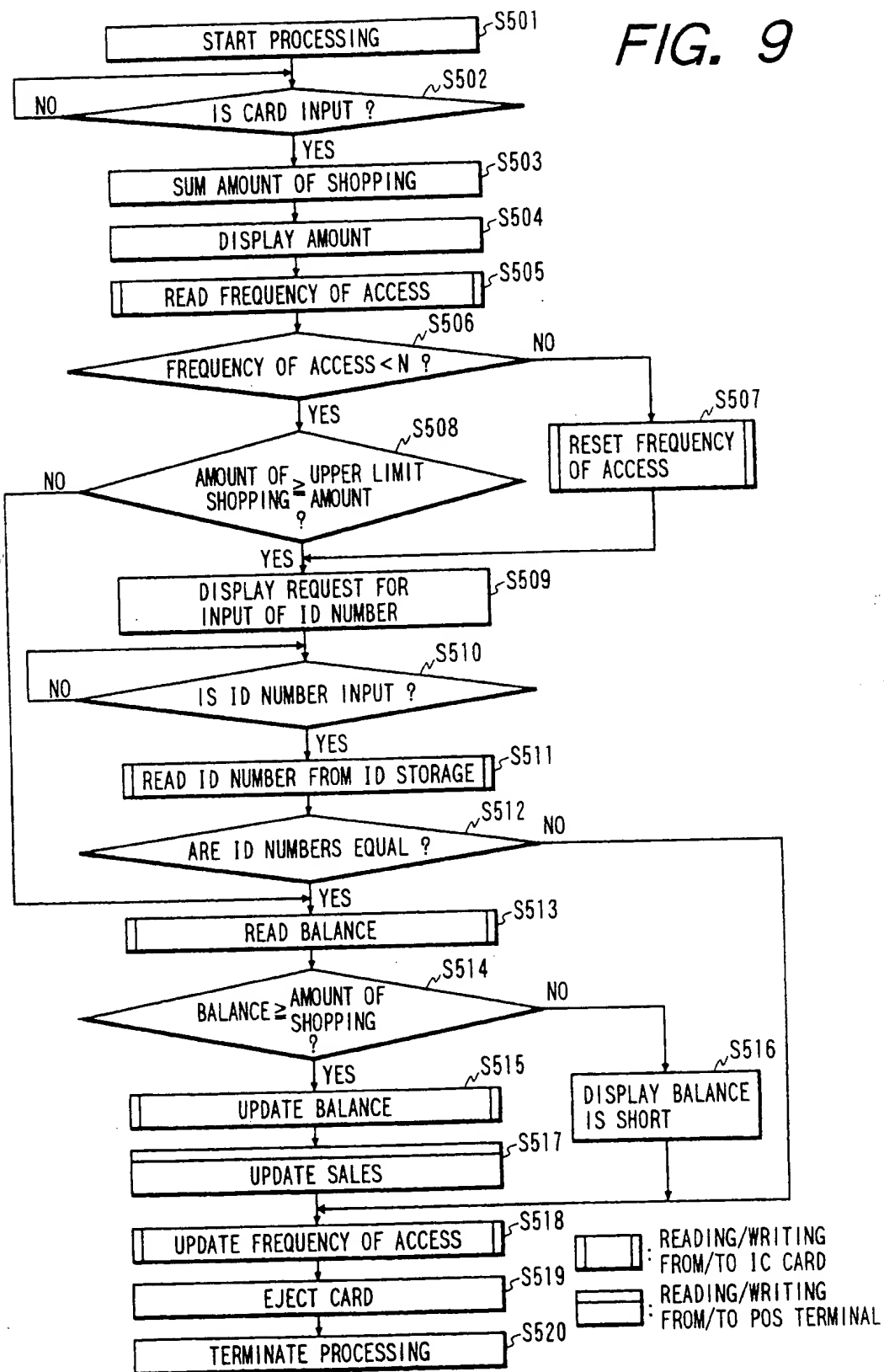


FIG. 11

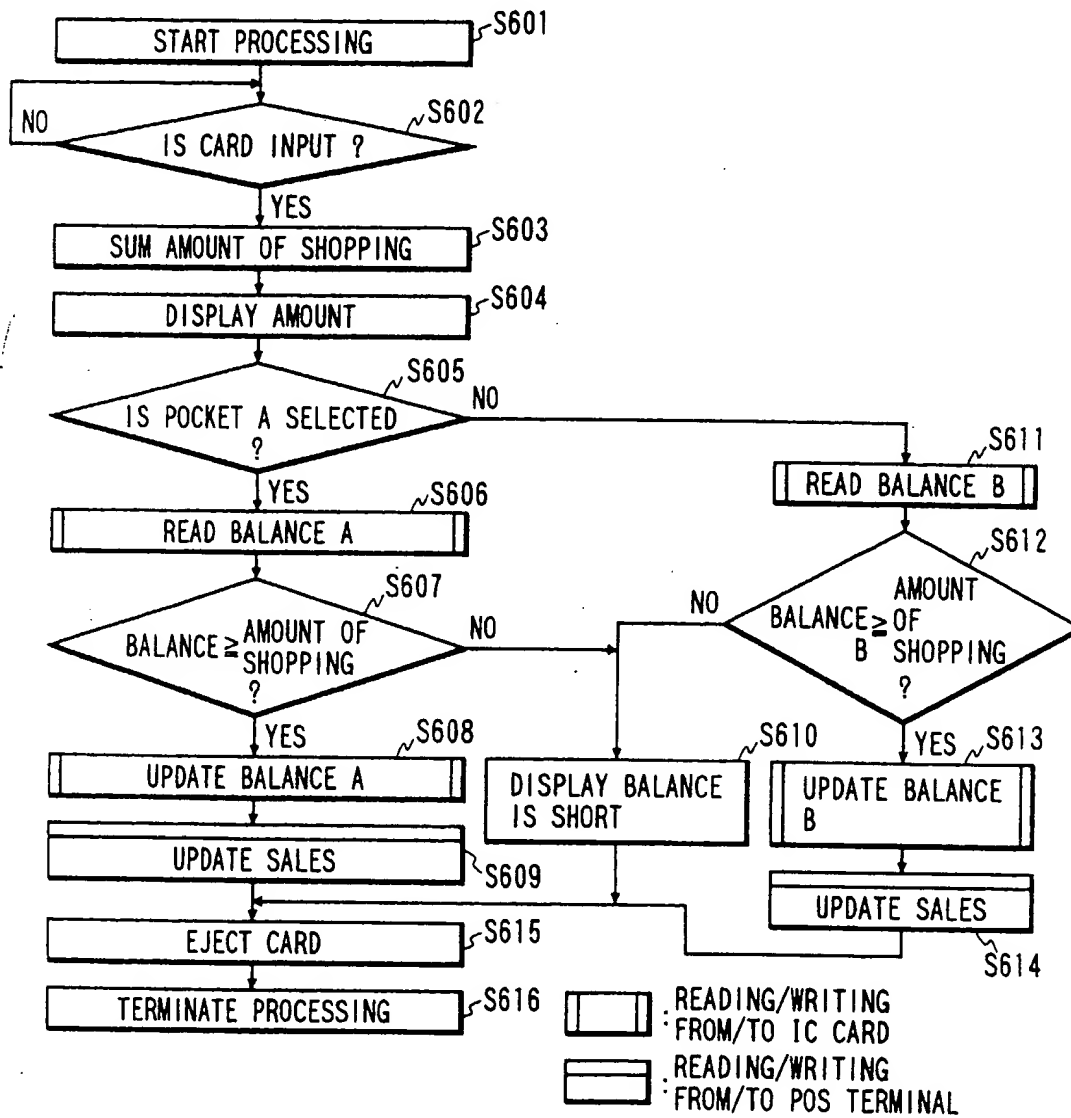


FIG. 13

SHOP NUMBER	CONTENTS OF SERVICE	DATE	POINT	TOTAL POINTS
A0001	A	1995. 4. 3 1995. 4. 30 ⋮	300 1000 ⋮	300 1300 ⋮
A0024	C	1995. 5. 5 1995. 6. 2 1995. 6. 5 ⋮	1000 -1000 500 ⋮	1000 0 500 ⋮
B0007	B	1995. 5. 2 1995. 6. 30 ⋮	500 700 ⋮	500 1200 ⋮
⋮	⋮	⋮	⋮	⋮

A : ADD 7% TO POINT

B : ADD 5% TO POINT

C : ADD 3% TO POINT

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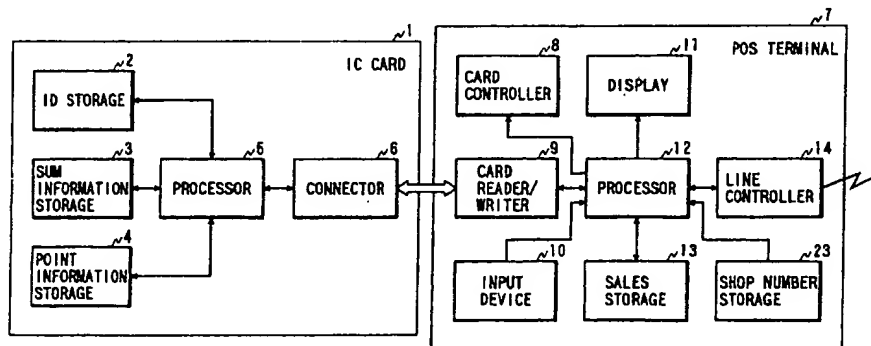
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FIG. 1



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European Patent
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Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-4, 12-15, 18-29

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 96 11 8451

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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03-04-2000

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